United Nations ECE/TRANS/WP.29/2018/143

Economic and Social Council

Distr.: General
17 August 2018

Original: English

Economic Commission for Europe

Inland Transport Committee

World Forum for Harmonization of Vehicle Regulations

176th session
Geneva, 13-16 November 2018
Item 4.9.1 of the provisional agenda
1958 Agreement:
Consideration of draft amendments
to existing UN Regulations submitted by GRPE

Proposal for Supplement 4 to the 03 series of amendments to UN Regulation No. 24 (Visible pollutants, measurement of power of Compression Ignition engine (Diesel smoke))

Submitted by the Working Party on Pollution and Energy*

The text reproduced below was adopted by the Working Party on Pollution and Energy (GRPE) at its seventy-sixth session (ECE/TRANS/WP.29/GRPE/77, para. 38). It is based on ECE/TRANS/WP.29/GRPE/2018/19. It is submitted to the World Forum for Harmonization of Vehicle Regulations (WP.29) and to the Administrative Committee AC.1 for consideration at their November 2018 sessions.

* In accordance with the programme of work of the Inland Transport Committee for 2018–2019 (ECE/TRANS/274, para. 123 and ECE/TRANS/2018/21, Cluster 3.1), the World Forum will develop, harmonize and update UN Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

GE.18-13656(E)
1813656

Please recycle

Supplement 4 to the 03 series of amendments to UN Regulation No. 24 (Visible pollutants, measurement of power of Compression Ignition engine (Diesel smoke))

Annex 4

Paragraph 3.2., amend to read:

"3.2. Fuel

The fuel used shall be the one available on the market. In any case of dispute, the fuel shall be the reference fuel whose specifications are given in Annex 6 to this Regulation."

Insert a new paragraph 3.3.3.:

"3.3.3. When a turbo-charged engine is fitted with a system which allows compensating the ambient conditions temperature and altitude, at the request of the manufacturer, the correction factor α_a or α_d shall be set to the value of 1."

Annex 10

Insert a new paragraph 6.4.3.:

"6.4.3. When a turbo-charged engine is fitted with a system which allows compensating the ambient conditions temperature and altitude, at the request of the manufacturer, the correction factor α_a or α_d shall be set to the value of 1."

United Nations ECE/TRANS/WP.29/2018/144

Economic and Social Council

Distr.: General
17 August 2018

Original: English

Economic Commission for Europe

Inland Transport Committee

World Forum for Harmonization of Vehicle Regulations

176th session
Geneva, 13-16 November 2018
Item 4.9.2 of the provisional agenda
1958 Agreement:
Consideration of draft amendments
to existing UN Regulations submitted by GRPE

Proposal for Supplement 2 to the 03 series of amendments to UN Regulation No. 83 (Emissions of M_1 and N_1 vehicles)

Submitted by the Working Party on Pollution and Energy*

The text reproduced below was adopted by the Working Party on Pollution and Energy (GRPE) at its seventy-sixth session (ECE/TRANS/WP.29/GRPE/77, para. 12). It is based on ECE/TRANS/WP.29/GRPE/2018/18 as amended by Annex VII to the report. It is submitted to the World Forum for Harmonization of Vehicle Regulations (WP.29) and to the Administrative Committee AC.1 for consideration at their November 2018 sessions.

* In accordance with the programme of work of the Inland Transport Committee for 2018–2019 (ECE/TRANS/274, para. 123 and ECE/TRANS/2018/21, Cluster 3.1), the World Forum will develop, harmonize and update UN Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

GE.18-13659(E)

1813659

Please recycle

Supplement 2 to the 03 series of amendments to UN Regulation No. 83 (Emissions of M_1 and N_1 vehicles)

Annex 4

Appendix 5, paragraph 2.3.3.2., amend to read:

"2.3.3.2. A temperature sensor shall be installed immediately before the volume measuring device. This temperature sensor shall have an accuracy and a precision of ± 1 °C and a response time of 1.0 second or less at 62 per cent of a given temperature variation (value measured in water or silicone oil)."

United Nations ECE/TRANS/WP.29/2018/145

Economic and Social Council

Distr.: General
17 August 2018

Original: English

Economic Commission for Europe

Inland Transport Committee

World Forum for Harmonization of Vehicle Regulations

176th session
Geneva, 13-16 November 2018
Item 4.9.3 of the provisional agenda
1958 Agreement:
Consideration of draft amendments
to existing UN Regulations submitted by GRPE

Proposal for Supplement 1 to the 04 series of amendments to UN Regulation No. 83 (Emissions of M_1 and N_1 vehicles)

Submitted by the Working Party on Pollution and Energy*

The text reproduced below was adopted by the Working Party on Pollution and Energy (GRPE) at its seventy-sixth session (ECE/TRANS/WP.29/GRPE/77, para. 12). It is based on ECE/TRANS/WP.29/GRPE/2018/18 as amended by Annex VII to the report. It is submitted to the World Forum for Harmonization of Vehicle Regulations (WP.29) and to the Administrative Committee AC.1 for consideration at their November 2018 sessions.

* In accordance with the programme of work of the Inland Transport Committee for 2018–2019 (ECE/TRANS/274, para. 123 and ECE/TRANS/2018/21, Cluster 3.1), the World Forum will develop, harmonize and update UN Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

GE.18-13662(E)
1813662

Please recycle

Supplement 1 to the 04 series of amendments to UN Regulation No. 83 (Emissions of M_1 and N_1 vehicles)

Annex 4

Appendix 5, paragraph 2.3.3.2., amend to read:

"2.3.3.2. A temperature sensor shall be installed immediately before the volume measuring device. This temperature sensor shall have an accuracy and a precision of ± 1 °C and a response time of 1.0 second or less at 62 per cent of a given temperature variation (value measured in water or silicone oil)."

United Nations ECE/TRANS/WP.29/2018/146

Economic and Social Council

Distr.: General
17 August 2018

Original: English

Economic Commission for Europe

Inland Transport Committee

World Forum for Harmonization of Vehicle Regulations

176th session
Geneva, 13-16 November 2018
Item 4.9.4 of the provisional agenda
1958 Agreement:
Consideration of draft amendments
to existing UN Regulations submitted by GRPE

Proposal for Supplement 12 to the 05 series of amendments to UN Regulation No. 83 (Emissions of M_1 and N_1 vehicles)

Submitted by the Working Party on Pollution and Energy*

The text reproduced below was adopted by the Working Party on Pollution and Energy (GRPE) at its seventy-sixth session (ECE/TRANS/WP.29/GRPE/77, para. 12). It is based on ECE/TRANS/WP.29/GRPE/2018/18 as amended by Annex VII to the report. It is submitted to the World Forum for Harmonization of Vehicle Regulations (WP.29) and to the Administrative Committee AC.1 for consideration at their November 2018 sessions.

* In accordance with the programme of work of the Inland Transport Committee for 2018–2019 (ECE/TRANS/274, para. 123 and ECE/TRANS/2018/21, Cluster 3.1), the World Forum will develop, harmonize and update UN Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

GE.18-13669(E)
1813669

Please recycle

Supplement 12 to the 05 series of amendments to UN Regulation No. 83 (Emissions of M_1 and N_1 vehicles)

Annex 4

Appendix 5, paragraph 2.3.3.2., amend to read:

"2.3.3.2. A temperature sensor shall be installed immediately before the volume measuring device. This temperature sensor shall have an accuracy and a precision of ± 1 °C and a response time of 1.0 second or less at 62 per cent of a given temperature variation (value measured in water or silicone oil)."

United Nations ECE/TRANS/WP.29/2018/147

Economic and Social Council

Distr.: General
17 August 2018

Original: English

Economic Commission for Europe

Inland Transport Committee

World Forum for Harmonization of Vehicle Regulations

176th session
Geneva, 13-16 November 2018
Item 4.9.5 of the provisional agenda
1958 Agreement:
Consideration of draft amendments to existing UN Regulations submitted by GRPE

Proposal for Supplement 12 to the 06 series of amendments to UN Regulation No. 83 (Emissions of M_1 and N_1 vehicles)

Submitted by the Working Party on Pollution and Energy*

The text reproduced below was adopted by the Working Party on Pollution and Energy (GRPE) at its seventy-sixth session (ECE/TRANS/WP.29/GRPE/77, para. 12). It is based on ECE/TRANS/WP.29/GRPE/2018/13 as amended by Annexes IV, VI and VII and Addendum 1 to the report. It is submitted to the World Forum for Harmonization of Vehicle Regulations (WP.29) and to the Administrative Committee AC.1 for consideration at their November 2018 sessions.

* In accordance with the programme of work of the Inland Transport Committee for 2018–2019 (ECE/TRANS/274, para. 123 and ECE/TRANS/2018/21, Cluster 3.1), the World Forum will develop, harmonize and update UN Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

GE.18-13675(E)
1813675

Please recycle

Supplement 12 to the 06 series of amendments to UN Regulation No. 83 (Emissions of M_1 and N_1 vehicles)

Paragraph 2.22.1., amend to read:

"2.22.1. "*Mono-fuel gas vehicle*" means a vehicle that is designed primarily for permanent running on LPG or NG/biomethane or hydrogen, but may also have a petrol system for emergency purposes or starting only, where the nominal capacity of the petrol tank does not exceed 15 litres."

Paragraphs 2.23. and 2.23.1., amend to read:

"2.23. "*Bi-fuel vehicle*" means a vehicle with two separate fuel storage systems that is designed to run primarily on only one fuel at a time; however the simultaneous use of both fuels is permitted in limited amount and duration.

2.23.1. "*Bi-fuel gas vehicle*" means a bi-fuel vehicle where the two fuels are petrol (petrol mode) and either LPG, NG/biomethane, or hydrogen."

Paragraph 5.3.1.2.4., amend to read:

"5.3.1.2.4. During the test the exhaust gases are diluted and a proportional sample collected in one or more bags. The exhaust gases of the vehicle tested are diluted, sampled and analysed, following the procedure described below, and the total volume of the diluted exhaust is measured. Not only are the carbon monoxide, hydrocarbon and nitrogen oxide emissions recorded, but also the particulate pollutant emissions from vehicles equipped with compression-ignition engines and direct injection petrol engines."

Add a new paragraph 14:

"14. Alternative procedures

14.1. Alternative procedure for periodical regenerating systems

As an alternative to the procedure set out in Annex 13 of this Regulation, the manufacturer may use the results determined by the WLTP procedure, described in Appendix 1 to Annex 6 of Amendment 4 of the UN GTR No. 15.

In this case, the following additional provisions apply:

(a) At the request of the manufacturer and with the agreement of the responsible authority the Extra High phase may be excluded for determining the regenerative factor Ki for Class 2 and Class 3 vehicles.

(b) Instead of the criterion described in paragraph 7.1.4.2. of this Regulation the criterion shall be based on the WLTP test mass: The test mass of each vehicle in the family must be less than or equal to the test mass of the vehicle used for the Ki demonstration test plus 250 kg.

(c) Additive and multiplicative Ki are valid and are to be applied accordingly.

14.2. Alternative procedure for the Type V test

As an alternative to the road load, inertia weight class and Type I test cycle of this Regulation those from the WLTP, described in Amendment 4 of the UN GTR No. 15, may be used for the durability test.

In this case, the following additional provisions apply:

(a) The references to the Type I test in paragraph 2.3.1.7. of Annex 9 of this Regulation shall be understood as reference to the Type 1 test in Amendment 4 of the UN GTR No. 15.

(b) The references to the Type I test in paragraph 2.3.2.6. of Annex 9 of this Regulation shall be understood as reference to the Type 1 test in Amendment 4 of the UN GTR No. 15.

(c) The references to the Type I test in paragraph 3.1. of Annex 9 of this Regulation shall be understood as reference to the Type 1 test in Amendment 4 of the UN GTR No. 15.

(d) The reference in paragraph 6.3.1.2. of Annex 9 of this Regulation to the methods in Appendix 7 to Annex 4a shall be understood as being a reference to Annex 4 of Amendment 4 of the UN GTR No. 15.

(e) The reference in paragraph 6.3.1.4. of Annex 9 of this Regulation to Annex 4a shall be understood as being a reference to Annex 4 of Amendment 4 of the UN GTR No. 15.

(f) The road load coefficients to be used shall be those for vehicle low (VL). If VL does not exist or the total load of vehicle high (VH) at 80 km/h is higher than the total load of VL at 80 km/h + 5 %, then the VH road load shall be used. VL and VH are defined in point 4.2.1.1.2. of Annex 4 of Amendment 4 of the UN GTR No. 15.

(g) For Class 2 and Class 3 vehicles, all four phases of the WLTC shall be used.

(h) Additive and multiplicative DF factors are valid and are to be applied accordingly.

14.3. Alternative procedure for the Type VI test

As an alternative to the road load coefficients and inertia weight class according to Appendix 7 of Annex 4a of this Regulation the road load coefficients and test mass of WLTP, described in Annex 4 of Amendment 4 of the UN GTR No. 15, may be used.

In this case, the following additional provision apply:

The road load coefficients to be used shall be those for vehicle low (VL). If VL does not exist then the VH road load shall be used. VL and VH are defined in point 4.2.1.1.2. of Sub-Annex 4 to Annex XXI. The dynamometer shall be adjusted to simulate the operation of a vehicle on the road at -7 °C. Such adjustment may be based on a determination of the road load force profile at -7 °C. Alternatively, the driving resistance determined may be adjusted for a 10% decrease of the coast-down time. The technical service may approve the use of other methods for determining the driving resistance.

14.4. Alternative procedure for the OBD test

As an alternative to the Type I test cycle of this Regulation, Type I test cycle described in Annex 6 of Amendment 4 of the UN GTR No. 15 may be used.

In this case, the following additional provision apply:

The reference to the Type I test cycle in section 2.1.3 of Appendix 1 to Annex 11 of this Regulation shall be understood as a reference to the Type I test of Amendment 4 of the UN GTR No. 15 for each individual malfunction to be demonstrated.

For Class 2 and Class 3 vehicles, all four phases of the WLTC shall be used.

The use of additional preconditioning cycles or alternative preconditioning methods shall be documented in the type approval documentation.

14.4.1. The Type I test cycle referred to in paragraph 3.3.3.2. of Annex 11 shall be understood as being the same as the Type 1 test cycle that was used for at least two consecutive cycles after introduction of the misfire faults according to paragraph 6.3.1.2. of Appendix 1 to Annex 11.

14.4.2. Paragraph 6.2.2. of Appendix 1 to Annex 11 shall be understood to read as follows:

'At the request of the manufacturer, alternative and/or additional preconditioning methods may be used.'"

Appendix 6

Paragraph 1., amend to read:

" 1. Introduction

This Annex sets out the requirements for vehicles that rely on the use of a reagent for the after-treatment system in order to reduce emissions. Every reference in this Annex to 'reagent tank' shall be understood as also applying to other containers in which a reagent is stored."

Insert new paragraphs 1.1. and 1.2. to read:

"1.1. The capacity of the reagent tank shall be such that a full reagent tank does not need to be replenished over an average driving range of 5 full fuel tanks providing the reagent tank can be easily replenished (e.g. without the use of tools and without removing vehicle interior trim. The opening of an interior flap, in order to gain access for the purpose of reagent replenishment, shall not be understood as the removal of interior trim). If the reagent tank is not considered to be easy to replenish as described above, the minimum reagent tank capacity shall be at least equivalent to an average driving distance of 15 full fuel tanks. However, in the case of the option in paragraph 3.5. of this appendix, where the manufacturer chooses to start the warning system at a distance which may not be less than 2,400 km before the reagent tank becomes empty, the above restrictions on a minimum reagent tank capacity shall not apply.

1.2. In the context of this appendix, the term "average driving distance" shall be taken to be derived from the fuel or reagent consumption during a Type 1 test for the driving distance of a fuel tank and the driving distance of a reagent tank respectively."

Paragraph 2.1., amend to read:

"2.1. The vehicle shall include a specific indicator on the dashboard that informs the driver when reagent levels are below the threshold values specified in paragraph 3.5. of this appendix."

Paragraph 3.1., amend to read:

"3.1. The vehicle shall include a warning system consisting of visual alarms that informs the driver when an abnormality is detected in the reagent dosing e.g. when emissions are too high, the reagent level is low, reagent dosing is interrupted, or the reagent is not of a quality specified by the manufacturer. The warning system may also include an audible component to alert the driver."

Paragraph 3.4., amend the last sentence to read:

"3.4. ... The continuous warning system may be temporarily interrupted by other warning signals providing that they are important safety related messages."

Paragraph 3.5., amend to read:

"3.5. The warning system shall activate at a distance equivalent to a driving range of at least 2,400 km in advance of the reagent tank becoming empty, or at the choice of the manufacturer at the latest when the level of reagent in the tank reaches one of the following levels:

(a) A level expected to be sufficient for driving 150% of an average driving range with a complete tank of fuel; or

(b) 10% of the capacity of the reagent tank,

whichever occurs earlier."

Paragraph 5.5., amend to read:

"5.5. In the case of interruption in reagent dosing activity the driver warning system as referred to in paragraph 3. shall be activated, which shall display a message indicating an appropriate warning. Where the reagent dosing interruption is initiated by the engine system because the vehicle operating conditions are such that the vehicle's emission performance does not require reagent dosing, the activation of the driver warning system as referred to in paragraph 3 may be omitted, provided that the manufacturer has clearly informed the Type Approval Authority when such operating conditions apply. If the reagent dosing is not rectified within 50 km of the activation of the warning system then the driver inducement requirements of paragraph 8. below shall apply."

Paragraph 6.2., amend the first sub-paragraph to read:

"6.2. The manufacturer shall demonstrate that use of the sensors referred to in paragraph 6.1. above and any other sensors on the vehicle, results in the activation of the driver warning system as referred to in paragraph 3. above, the display of a message indicating an appropriate warning (e.g. "emissions too high - check urea", "emissions too high - check AdBlue", "emissions too high - check reagent"), and the activation of the driver inducement system as referred to in paragraph 8.3. below, when the situations referred to in paragraphs 4.2., 5.4. or 5.5. above occur."

Paragraph 6.2., insert a second sub-paragraph to read:

"For the purposes of this paragraph these situations are presumed to occur if the applicable NOx limit of the table set out in paragraph 5.3.1.4. of this Regulation multiplied by a factor of 1.5 is exceeded. The NOx emissions during the test to demonstrate compliance with these requirements shall be no more than 20 per cent higher than the above threshold."

Paragraph 8.2., amend to read:

"8.2. The inducement system shall activate at the latest when the level of reagent in the tank reaches:

(a) In the case that the warning system was activated at least 2,400 km before the reagent tank was expected to become empty, a level expected to be sufficient for driving the average driving range of the vehicle with a complete tank of fuel.

(b) In the case that the warning system was activated at the level described in paragraph 3.5.(a), a level expected to be sufficient for driving 75% of the average driving range of the vehicle with a complete tank of fuel; or

(c) In the case that the warning system was activated at the level described in paragraph 3.5.(b), 5 per cent of the capacity of the reagent tank.

(d) In the case that the warning system was activated ahead of the levels described in both paragraph 3.5.(a) and 3.5.(b) but less than 2,400 km in advance of the reagent tank becoming empty, whichever level described in (a) or (b) of this paragraph occurs earlier.

Where the alternative described in paragraph 6.1. is utilised, the system shall activate when the irregularities described in paragraphs 4 or 5 or the NOx levels described in paragraph 6.2. have occurred.

The detection of an empty reagent tank and the irregularities mentioned in paragraphs 4., 5., or 6. above shall result in the failure information storage requirements of paragraph 7. above taking effect."

Paragraph 8.3.1., amend to read:

"8.3.1. A "no engine restart after countdown" approach allows a countdown of restarts or distance remaining once the inducement system activates. Engine starts initiated by the vehicle control system, such as start-stop systems, are not included in this countdown.

8.3.1.1. In the case that the warning system was activated at least 2,400 km before the reagent tank was expected to become empty, or the irregularities described in paragraphs 4. or 5. or the NOx levels described in paragraph 6.2. have occurred, engine restarts shall be prevented immediately after the vehicle has travelled a distance expected to be sufficient for driving the average driving range of the vehicle with a complete tank of fuel since the activation of the inducement system.

8.3.1.2. In the case that the inducement system was activated at the level described in paragraph 8.2.(b), engine restarts shall be prevented immediately after the vehicle has travelled a distance expected to be sufficient for driving 75 % of the average driving range of the vehicle with a complete tank of fuel since the activation of the inducement system.

8.3.1.3. In the case that the inducement system was activated at the level described in paragraph 8.2.(c), engine restarts shall be prevented immediately after the vehicle has travelled a distance expected to be sufficient for driving the average driving range of the vehicle with 5 per cent of the capacity of the reagent tank, since the activation of the inducement system.

8.3.1.4. In addition, engine restarts shall be prevented immediately after the reagent tank becomes empty, should this situation occur earlier than the situations specified in paragraphs 8.3.1.1, 8.3.1.2., or 8.3.1.3."

Paragraph 8.3.4., amend to read:

"8.3.4. A "performance restriction" approach restricts the speed of the vehicle after the inducement system activates. The level of speed limitation shall be noticeable to the driver and significantly reduce the maximum speed of the vehicle. Such limitation shall enter into operation gradually or after an engine start. Shortly before engine restarts are prevented, the speed of the vehicle shall not exceed 50 km/h.

8.3.4.1. In the case that the warning system was activated at least 2,400 km before the reagent tank was expected to become empty, or the irregularities described in paragraphs 4. or 5. or the NOx levels described in paragraph 6.2. have occurred, engine restarts shall be prevented immediately after the vehicle has travelled a distance expected to be sufficient for driving the average driving range of the vehicle with a complete tank of fuel since the activation of the inducement system.

8.3.4.2. In the case that the inducement system was activated at the level described in paragraph 8.2.(b), engine restarts shall be prevented immediately after the vehicle has travelled a distance expected to be sufficient for driving 75 % of the average driving range of the vehicle with a complete tank of fuel since the activation of the inducement system.

8.3.4.3. In the case that the inducement system was activated at the level described in paragraph 8.2.(c), engine restarts shall be prevented immediately after the vehicle has travelled a distance expected to be sufficient for driving the average driving range of the vehicle with 5 per cent of the capacity of the reagent tank, since the activation of the inducement system.

8.3.4.4. In addition, engine restarts shall be prevented immediately after the reagent tank becomes empty, should this situation occur earlier than the situations specified in paragraphs 8.3.4.1, 8.3.4.2. or 8.3.4.3."

Paragraph 8.4., amend to read:

"8.4. Once the inducement system has prevented engine restarts, the inducement system shall only be deactivated if the irregularities specified in paragraphs 4., 5., or 6. of this appendix have been rectified or if the quantity of reagent added to the vehicle meets at least one of the following criteria:

(a) Expected to be sufficient for driving 150% of an average driving range with a complete tank of fuel; or

(b) At least 10 per cent of the capacity of the reagent tank.

After a repair has been carried out to correct a fault where the OBD system has been triggered under paragraph 7.2. above, the inducement system may be reinitialised via the OBD serial port (e.g. by a generic scan tool) to enable the vehicle to be restarted for self-diagnosis purposes. The vehicle shall operate for a maximum of 50 km to enable the success of the repair to be validated. The inducement system shall be fully reactivated if the fault persists after this validation."

Delete paragraph 8.6. and renumber paragraphs 8.7. and 8.8. as 8.6. and 8.7.

Paragraph 9.3., amend to read:

"9.3. The instructions shall specify if consumable reagents have to be replenished by the vehicle driver between normal maintenance intervals. They shall indicate how the vehicle driver should replenish the reagent tank. The information shall also indicate a likely rate of reagent consumption for that type of vehicle and how often it should be replenished."

Paragraph 9.4., amend to read:

"9.4. The instructions shall specify that use of, and replenishing of, a required reagent of the correct specifications is mandatory for the vehicle to comply with the certificate of conformity issued for that vehicle type."

Paragraph 10., amend to read:

"10. Operating conditions of the after-treatment system

Manufacturers shall ensure that the emission control system retains its emission control function during all ambient conditions, especially at low ambient temperatures. This includes taking measures to prevent the complete freezing of the reagent during parking times of up to 7 days at 258 K (-15 °C) with the reagent tank 50 per cent full. If the reagent is frozen, the manufacturer shall ensure that the reagent shall be liquefied and ready for correct operation of the emission control system within 20 minutes of the vehicle being started at 258 K (-15 °C) measured inside the reagent tank."

Annex 4A, Appendix 2

Paragraph 1.3.5., amend to read:

"1.3.5. Volume Measurement in the Primary Dilution System

The method of measuring total dilute exhaust volume incorporated in the constant volume sampler shall be such that measurement is accurate to ±2% under all operating conditions. If the device cannot compensate for variations in the temperature of the mixture of exhaust gases and dilution air at the measuring point, a heat exchanger shall be used to maintain the temperature to within ±6K of the specified operating temperature.

If necessary, some form of protection for the volume measuring device may be used e.g. a cyclone separator, bulk stream filter, etc.

A temperature sensor shall be installed immediately before the volume measuring device. This temperature sensor shall have an accuracy and a precision of ± 1 °C and a response time of 1.0 second or less at 62 per cent of a given temperature variation (value measured in water or silicone oil).

The measurement of the pressure difference from atmospheric pressure shall be taken upstream from and, if necessary, downstream from the volume measuring device.

The pressure measurements shall have a precision and an accuracy of ±0.4kPa during the test."

Annex 7

Paragraph 7.4.4.3., amend to read:

"7.4.4.3. At the request of the manufacturer an alternative purge test procedure can be used, if the procedure has been presented to and has been accepted by the Technical Service during the type approval procedure."

Annex 8

Paragraph 3.2.1., amend to read:

"3.2.1. Start of engine, start of the sampling and the operation of the first cycle shall be in accordance with Table A4a/1 and Figure A4a/1 in Annex 4a to this Regulation."

Annex 14

Paragraph 3.1.1., amend to read:

"3.1.1. Two tests shall be performed under the following conditions:

Condition A: Test shall be started with a fully charged electrical energy/power storage device.

Condition B: Test shall be started with an electrical energy/power storage device in minimum state of charge (maximum discharge of capacity).

The profile of the State of Charge (SOC) of the electrical energy/power storage device during different stages of the Type I test is given in Appendix 1."

Paragraph 3.2.1., amend to read:

"3.2.1. Two tests shall be performed under the following conditions:

3.2.1.1. Condition A: Test shall be started with a fully charged electrical energy/power storage device.

3.2.1.2. Condition B: Test shall be started with an electrical energy/power storage device in minimum state of charge (maximum discharge of capacity) and carried out with an operating mode keeping the vehicle in charge-sustaining operating condition, that being an operating condition in which the energy/power stored in the energy/power storage device may fluctuate but, on average, is maintained at a neutral charging balance level while the vehicle is driven.

3.2.1.3. In agreement with the type approval authority and justified by the manufacturer, the following operation modes shall not be considered for the purpose of testing:

(a) Operating modes, such as 'charge mode', which are not limited to vehicle propulsion but which, in addition to vehicle propulsion, are charging the energy power/storage device in order to facilitate locally emission-free driving (e.g. under urban conditions);

(b) Operating modes for vehicle maintenance, such as 'maintenance mode';

(c) Operating modes for special limited purposes and not intended for daily operation, such as 'mountain mode'.

On the basis of information provided by the manufacturer, the Technical Service shall make sure that the emission limits specified in Table 1 of paragraph 5.3.1.4. of this Regulation are not exceeded in all hybrid modes, with the exception of the 'maintenance mode'.

3.2.1.4. The operating mode shall be selected as described in paragraphs 3.2.1.4.1. to 3.2.1.4.2.2. inclusive.

3.2.1.4.1. Operating mode selection for Condition A

3.2.1.4.1.1. If there is a single operating mode under condition A that is always selected when the vehicle is switched on regardless of the operating mode selected when the vehicle was previously shut down, and which cannot be switched to another mode without an intentional action of the driver or be redefined, this single operating mode shall be selected.

3.2.1.4.1.2. If there is no single operating mode under condition A that is always selected when the vehicle is switched on, the most electric energy consuming mode shall be selected.

3.2.1.4.2. Operating mode selection for Condition B

3.2.1.4.2.1. If there is a single operating mode under condition B that is always selected when the vehicle is switched on regardless of the operating mode selected when the vehicle was previously shut down, and which cannot be switched to another mode without an intentional action of the driver or be redefined, this single operating mode shall be selected.

3.2.1.4.2.2. If there is no single operating mode under condition B that is always selected when the vehicle is switched on, the most fuel consuming mode shall be selected."